



Innova Pure Water, Inc. – Biological Filter Bottle

www.innovapurewater.com

Device Information

The Innova Pure Water, Inc., Biological Filter Bottle is a handheld sports type squeeze bottle. The bottle has a capacity of 0.8 L (27 oz.). Use requires the user to simply fill with water to the recommended fill line. The bottle contains an activated carbon block prefilter and a 0.2 μm polysulfone hollow-fiber primary filter. The prefilter sits near the bottom of the bottle and is connected to the primary filter's plastic housing. The prefilter is removable. The hollow fibers of the primary filter are packed into a plastic housing and the open ends are oriented at the effluent side of the housing. The top of the hollow fiber filter cartridge is sealed with a hard epoxy with the open end of the hollow fibers flush with the epoxy surface; this forces water to flow into the hollow fibers for purification. There is a plastic housing enclosing both the primary and prefilter. This housing has two holes near its connection with the bottle cap. This requires the user to tilt the bottle to purify water. No manufacturer directions were received with this device explaining use, cleaning, or storage.

Effectiveness Against Microbial Pathogens

No testing data, independent or otherwise, was received testing this device strict to the U.S. Environmental Protection Agency (USEPA) Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1). Independent testing data was obtained from the manufacturer website showing bacteria reduction using a modified version of reference 1. The results, to the testing volume of 38 L, showed bacterial reduction of > 6-log. Laboratory results were obtained for cyst reduction using microspheres following the National Sanitation Foundation (NSF) International Standard 53 (reference 2). Results showed > 4-log reduction with testing volume based on percent flow drop. No indication is given as to the total volume of water tested. Additionally, no elevated turbidity water was used during testing, as required in reference 1. No data was received for virus reduction by this device. The data received and general knowledge of membrane filtration (references 3 and 4) indicate that this device should be capable of consistently meeting the minimum 6-log bacteria reduction and 3-log reduction for *Giardia* cysts and *Cryptosporidium* oocysts stated in the USEPA Protocol. It is not expected to consistently reduce viruses (4-log reduction). Based on general knowledge of size exclusion by membrane filtration, the Innova Pure Water, Inc., Biological Filter Bottle is assigned one \checkmark for bacteria reduction, one \checkmark each for the reduction of *Giardia* cysts and *Cryptosporidium* oocysts. The device receives an X for virus reduction (for an explanation of the rating checks [click here](#)).

Table. Expected Performance Against Microbial Pathogens.

Microbial Pathogen Type	Expected Disinfection Capability	Evaluation Rating	Primary Pathogen Reduction Mechanism
Bacteria	> 6-log	√	size exclusion
Viruses	> 4-log	X	-
<i>Giardia</i> cysts	> 3-log	√	size exclusion
<i>Cryptosporidium</i> oocysts	> 3-log	√	size exclusion

Production Rate and Capacity

Inherent to the production rate and capacity of filtration devices is the quality of the raw water source. Because it is a squeeze bottle, the actual production rate is dependent on the user. The production capacity stated on this device is up to 300 L. However, production capacity will vary widely with raw water quality (e.g., turbidity).

Cleaning, Replacement, and End of Life Indicator

This device cannot be backwashed to remove sediment from the filters (prefilter and primary). When the prefilter becomes clogged it must be replaced. For practical purposes, the filter cartridges are not cleanable. The manufacturer recommends replacing the filter cartridge every 3 months regardless of water volume filtered. The device contains no end of life indicator short of filter clogging.

Weight and Size

Dry weight (no accessories or tubing)	160 grams (estimated)
Size (height x diameter)	27 cm x 7 cm

Cost

Filter Bottle	\$35.00
Replacement primary filter with two prefilters	\$18.00



Device Evaluation

No data was received that challenged the Innova Pure Water, Inc., Biological Filter Bottle against the USEPA Protocol (reference 1). The limited data obtained from the manufacturer website, as well as general knowledge of size exclusion by membrane filtration, indicate that the device should be capable of consistently reducing bacteria, *Giardia* cysts and *Cryptosporidium* oocysts to the required minimum log reductions stated in reference 1. Since no testing was performed out to the manufacturer recommended production capacity there is no indication of the long term efficacy of this filter against pathogens or turbid water. This device is not expected to consistently reduce viruses (4-log). Additional treatment is necessary to remove viruses such as adding a disinfectant (e.g., chlorine, iodine, chlorine dioxide) to the water after filtration. The actual usable capacity of the bottle is less than the manufacturer stated volume of 0.8 L due to displacement by the filter cartridge and housing. This device contains a carbon block prefilter to reduce particulate matter and reduce source water taste and odor. Since the device is not able to be backwashed to remove accumulated particles, once clogged, the filter must be replaced. There is no indicator of process failure or end of device useful life.

Advantages

- Expected to consistently provide adequate protection from bacteria, *Giardia* cysts and *Cryptosporidium* oocysts, although device-specific testing data using the USEPA Protocol is not available.
- No wait time prior to consumption.
- Simple and effective.

Disadvantages

- No data testing this device against the USEPA Protocol (reference 1).
- Not expected to be consistently effective against viruses.
- Reduced production capacity when using high turbidity water.
- Not backwashable.
- No real-time indicator of process failure.

References

1. USEPA, 1989. Guide Standard and Protocol for Testing Microbiological Water Purifiers. *Federal Register*. 54:34067.
2. NSF International, 2004. Drinking Water Treatment Units – Health Effects (NSF/ANSI 53). NSF International, Ann Arbor, Michigan.



COTS Purifiers – Army Study Program, Project No. 31-MA-03E0-05.

3. Laboratory challenge data obtained from the manufacturer website.
4. U.S. Army Center for Health Promotion and Preventive Medicine, 2005. *Technical Information Paper; Filtration in the Use of Individual Water Purification Devices*, Aberdeen Proving Ground, MD.

